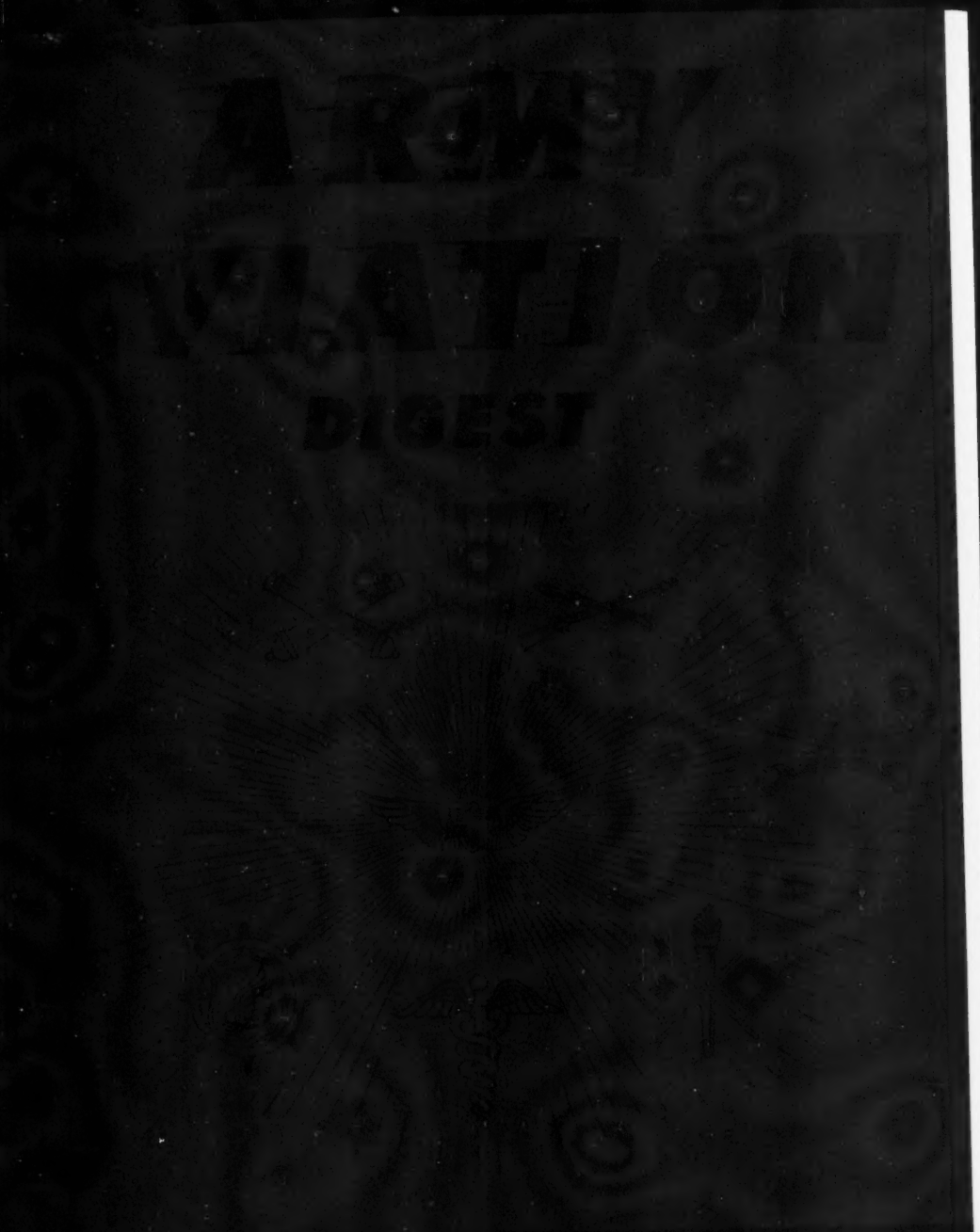
ARMY AVIATION DIGEST



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CONTENTS

THE COMMANDANT'S COLUMN 3
Brigadier General Carl I. Hutton, *USA*

ARMY TACTICAL AIR NAVIGATION AND TRAFFIC CONTROL 5
Dr. William M. Young

L-23 MODIFICATION: STOWING OF LOOSE EQUIPMENT 9
Captain Ellis D. Hill, *Artillery*

NEW LOW-FREQUENCY WEATHER SERVICE 12

ETC. 13
Leighton Collins

UER HIGHLIGHTS 21
Major Fred R. Reed, *Transportation Corps*

BOOKS FOR THE ARMY AVIATOR 26

CRASH REPORT 29

THE GRAY HAIR DEPARTMENT 31

STRAIGHT AND LEVEL 40

COVER: Seven branches of the Army—Infantry, Artillery, Armor, the Engineer Corps, the Signal Corps, the Transportation Corps, and the Medical Service—have organic Army aviation support.

This copy is not for sale. It is intended for more than one reader.

PLEASE READ IT AND PASS IT ALONG

EDITOR-IN-CHIEF

Captain Weyman S. Carver

ASSISTANT EDITOR-IN-CHIEF

Captain Richard W. Kohlbrand

EDITOR

LeGene Lott

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Manuscripts, photographs, and other illustrations pertaining to the above subjects of interest to personnel concerned with Army aviation are invited. Direct communication is authorized to: Editor-in-Chief, ARMY AVIATION DIGEST, Army Aviation School, Fort Rucker, Alabama.

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THE COMMANDANT'S COLUMN

Brigadier General Carl I. Hutton, *USA*
Commanding General, The Army Aviation Center

The views expressed in this article are not necessarily those of the Department of the Army.—The Editor

Leighton Collins

IN THIS ISSUE we have reprinted, by permission of Leighton Collins, an article from his "ETC." column, a regular feature in *Air Facts* magazine. There are three purposes for this. First, and perhaps least, the article is directly pertinent to Army Aviation at the present stage as well as to private flying. Second, the reprint should remind Army aviators that the magazine *Air Facts* for years has been required reading for anyone who wants to keep current with developments in those aviation fields in which we have a special interest. Third, and most important, we wanted to re-introduce a gentleman who has done more to promote aircraft utility in the United States than any other individual.

It has been a privilege over the years to ride with Leighton Collins (through gradually decreasing weather) in his C-3 Aeronca, in his Culver Cadet *Plain Vanilla*, in his Piper Tri-Pacer, and recently in somebody's Cessna 180LC. These journeys have covered a good bit of the Western Hemisphere, and they have introduced about everybody who has done anything toward making the airplane a useful vehicle. It is hard to see how anyone who has missed riding copilot on all of those flights can replace the experience.

His reports on new aircraft have come to be the model followed by other aviation publications. How do they fly? What are their good points? What bad? It is touchy business writing with any degree of frankness about the characteristics of a new airplane. Usually these craft carry not only a great investment of money, but also a full load of pride, dreams, and aspirations. Writing about them is like describing a new-born only child. Beware the mother!

When you meet Leighton Collins, you begin to understand how he has managed to carry *Air Facts* through many aviation droughts to its present affluence. He has, naturally, the intelligence and the drive which are prerequisites for such a success. His hallmark consists of sincerity, understanding, and complete integrity. He is known for these throughout the airplane business. He says what he believes and he is not responsive to pressure.

He has made mistakes occasionally in positions he has taken but he does not hesitate to eat his words, ungarnished and unsalted. When you consider that he has always been in the advance guard, however, the errors have been insignificant. How many of his programs have become so commonly accepted that it is difficult to remember it was not always so! Following his constant tugging, the private airplane has grown from a toy used for circuits and bumps on weekends to an ocean-crossing, almost all-weather piece of flexible and indispensable transportation.

Here is one fact which many Army aviators may not know about Leighton Collins. He first wrote and printed an article during the summer of 1940 about the utility of the then-current airplane types to the ground soldier. At that time the idea appeared farfetched. World War II showed how correct he was and now, 15 years later, Army Aviation is beginning to approach some of his other ideas.

A salute to Leighton Collins! He is one of the earliest and staunchest supporters of Army Aviation.

New Phonetic Alphabet

As of 1 March 1956, the International Civil Aviation Organization's phonetic alphabet is effective for U. S. military services (Reference: par. 3, AR 105-30, 7 Nov 1955). For the edification of Army aviators, it is:

A — ALFA	**H — HOTEL**	**O — OSCAR**	**V — VICTOR**
B — BRAVO	**I — INDIA**	**P — PAPA**	**W — WHISKEY**
C — CHARLIE	**J — JULIETT**	**Q — QUEBEC**	**X — X-RAY**
D — DELTA	**K — KILO**	**R — ROMEO**	**Y — YANKEE**
E — ECHO	**L — LIMA**	**S — SIERRA**	**Z — ZULU**
F — FOXTROT	**M — MIKE**	**T — TANGO**	
G — GOLF	**N — NOVEMBER**	**U — UNIFORM**	

ARMY TACTICAL AIR NAVIGATION AND TRAFFIC CONTROL

Dr. William M. Young

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or The Army Aviation School.—The Editor

IN ANY COMBAT operation, it is the desire of the field army commander to be able to move his units rapidly in any direction, at any time, within the theater of operations and to know in advance what opposition awaits his units at a new location. Collection and evaluation of information which will reveal this opposition is the mission of battlefield surveillance, a mission in which the Army aviator plays an important role. However, the phase in which tactical air navigation and traffic control systems are most essential is the actual movement of men and materiel.

In World War II and in Korea, movement of units was confined largely to roads and was accomplished by motorized equipment except for airdrop and amphibious movements. The airdrop was the forerunner of the philosophy of high mobility which modern warfare demands. It is interesting to analyze the Army's present capability in regard to this new philosophy of mobility. To what extent can a field army commander move units rapidly (by air) in any direction at any time.

The introduction of fixed-wing aircraft as troop and cargo carriers has assisted in the solution of the problem but has required the use of prepared runways and the associated concentration of men and materiels at these airstrips. These conditions are limitations to flexible operation and may require rearward movement of materiel and men to assembly points for air transport with consequent loss of time. For the most part fixed-wing aircraft operation in forward areas is limited to the dropping of men and materiel. Except in unusual circumstances, recovery by fixed-wing aircraft is not feasible.

The rotary-wing aircraft, on the other hand, requires much less space for a landing area. It can emplace its cargo exactly and can be used for evacuation purposes. It is best employed close to the ground, thus assisting in the element of surprise. In addition, it can operate freely in any direction during visual flight conditions. It is the movement of men and materiel at night or under instrument weather conditions that presents the problems.

Nondirectional Beacon

Since modern combat requires dispersion of forces and low level flight, the Army has required that its tactical navigation systems have a tolerance within 2 percent, be effective under non-line-of-sight conditions if a ground transmitter is to be used, and be invulnerable to jamming. Should the Army go into the field now, it would have to use the most elementary of navigation systems, the low frequency nondirectional beacon and the 75-mc. marker beacon assisted by a ground-controlled approach aid at destination. The low frequency nondirectional beacon is subject to atmospheric and enemy jamming, but it is a non-line-of-sight system and allows aircraft to fly between hills. The use of the marker beacon transmitter necessitates the use of air corridors and restricts directions of flight. These facts must be accepted. As yet no self-contained navigation system has been developed to a point where it is ready for Army use from an accuracy and weight standpoint. Visual omnidirectional ranges (VOR) and the Tactical Air Navigation System (TACAN) sponsored by the Air Force and Navy are line-of-sight systems and do not allow aircraft to fly low between mountain masses. Hyperbolic low frequency systems such as the British Decca System require three to four stations rather exactly sited and do not lend themselves to dispersion of forces or rapid change of location. In addition, an analysis of higher frequency systems such as consol, sonne, loran, shoran, radio web, etc., discloses drawbacks not easily overcome in combat.

The next advancement over the nondirectional beacon (NDB) is the familiar four-course range. This system, although jammable, can be used to better advantage than the NDB. At least its radiation

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Dr. William M. Young *is in the Office of the Chief Signal Officer, Department of the Army, Washington, D. C.—The Editor*

toward the enemy can be reduced somewhat. However, it is susceptible to atmospheric interference and is vulnerable to such phenomena as split beam, multiple beam and bending. It cannot, therefore, define an exact air corridor but defines rather a broad area which becomes wider the greater the distance from the station. The use of such on-course areas simplifies the task of the antiaircraft artillery in sorting out friendly aircraft; but a system of air traffic control is required so that a maximum of cargo and troops can be moved.

Simulated Tests

To determine the effectiveness of the NDB navigation system, an installation of simulated army, corps, and three division headquarters is being put in operation at the Army Electronic Proving Ground, Fort Huachuca, Ariz. Army will be at Douglas, corps at Fort Huachuca, and divisions at Nogales, Tucson, and an intervening ranch. The maximum distance from army to corps is more than 100 air miles, thus creating a realistic geographical situation. And there are plenty of mountains to miss! Take a look at the sectional air chart of Douglas; this section offers a typical nasty-fighting area for an army.

It is planned that during the test operation a "free-way" system of corridors will be used, one for eastbound traffic and another for westbound. Slow aircraft will fly low; faster aircraft at higher altitudes. Aircraft will be admitted to the appropriate altitude at regular time intervals and will fly at fixed air speeds. Each headquarters will have radar equipment, appropriate tower men, and GCA controllers to assist aircraft in the terminal area. Enroute control over this portion of the network will be exercised by corps. Flight service, weather, and control will be conducted by point-to-point communications as far as possible. A coordination center will be established to identify flights for antiaircraft artillery units. No attempt will be made to control aircraft forward of the main division airfield.

Effectiveness

How effective will the system be? Assume that 800 aircraft in the field army are in flying condition and that 25 percent are used for observation and reconnaissance missions forward of division. There are then 200 per corps available for other purposes. If 30

minutes is required to unload, load, service, and dispatch an aircraft, there should be 100 aircraft in the air at any one time, or about 100 landings and 100 takeoffs per hour in the corps net. Simulation tests of the system show that this is possible, but it must be proved by actual flight testing.

The test of the NDB system will be followed by a test of a four-course range installation and a test of a VOR installation to determine what use can be made of these devices as interim navigation aids. Limited tests will also be run on TACAN to verify its behavior in mountainous country. Tests made by the Air Force and Navy in level and rolling terrain will be accepted and not duplicated. The Decca System will be tested for the Army and for the Air Navigation Development Board. The ANDB is interested in Decca for use in the Federal Airways System for commercial helicopter operations. Each system, of course, will "get the works" from summer thunderstorms and from jamming devices to determine its adequacy for tactical use.

By December 1956, the Army should be in a position to select the interim navigation system best suited for tactical use and the best means of controlling and expediting traffic.

In the meantime, research and development is underway to assist the aviator in flying a precise course. To accomplish this, it is necessary to provide:

1. A non-line-of-sight navigation system capable of giving the aviator his position on a grid or by direction and his distance from a point in any weather and in the presence of enemy jamming.
2. A means of telling the aviator: How high he is above the ground; how close he is to mountains, towers, and other stationary obstacles; how close he is to other aircraft at his altitude and in which direction they are going.
3. A means of informing friendly artillery that he is not a bogie.

When these three aids are available within accuracy and weight limitations, precisely navigated flying will be possible and "traffic control" may be largely reduced to traffic rules for selected altitudes and ground monitoring for assistance to aircraft in flight. The ground commander will then have the necessary capability of tactical aerial mobility on an around-the-clock basis without regard to adverse weather.

L-23 MODIFICATION: STOWING OF LOOSE EQUIPMENT

Captain Ellis D. Hill, *Artillery*

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor

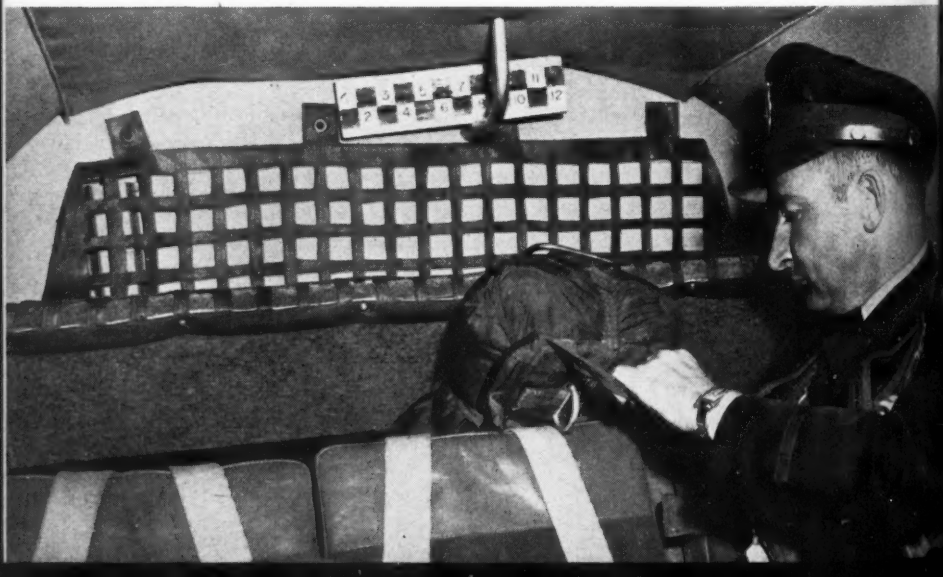
COMMENTS FROM PILOTS and passengers of the L-23 indicate that the stowing of parachutes, briefcases, books, and other loose equipment on the shelf behind and above the rear seat presents certain hazards to occupants. During flights in extremely turbulent air, or in the event of a sudden stop on the runway, articles are likely to be thrown about the cabin.

In the interest of safety, Army Test Board Nr. 6, CONARC, Fort Rucker, Ala., recently modified an L-23 to incorporate two means of stowing loose equipment. Photographs on the following pages illustrate this modification, and it is presented here as a suggested installation in all L-23 aircraft assigned to Army units.

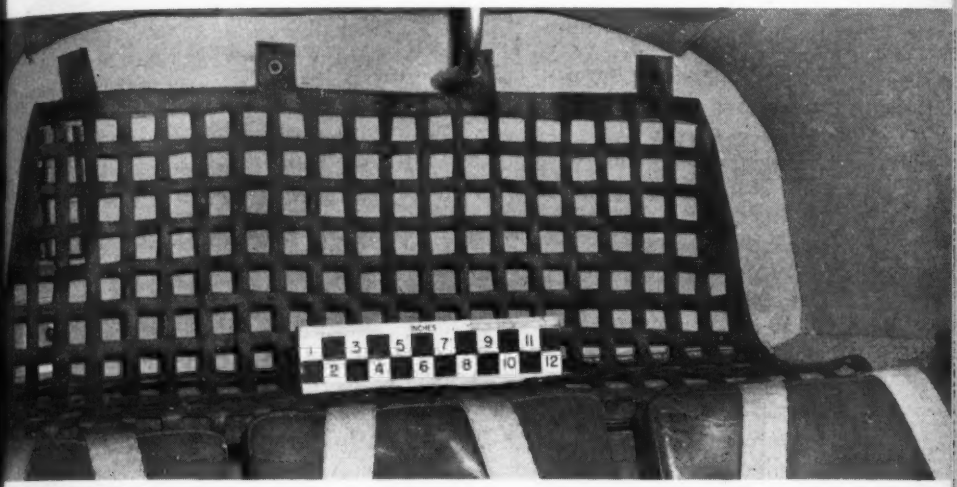
The installation of four hooks on the back of the rear seat assembly permits orderly, accessible stowage of parachutes in the rear baggage compartment. The hooks are made from steel rods, each approximately 5½ inches long. One end of each rod is threaded and secured to the seat assembly. Approximately 1½ inches of the other end of each rod is bent up at a 90-degree angle to form the hook. Stowage of parachutes in this location is recommended *only* when the access shelf is not loaded to the extent that it could not be raised quickly in an emergency.

This material was supplied by Captain Ellis D. Hill, project officer, Army Test Board Nr 6, CONARC, Fort Rucker, Alabama.—The Editor

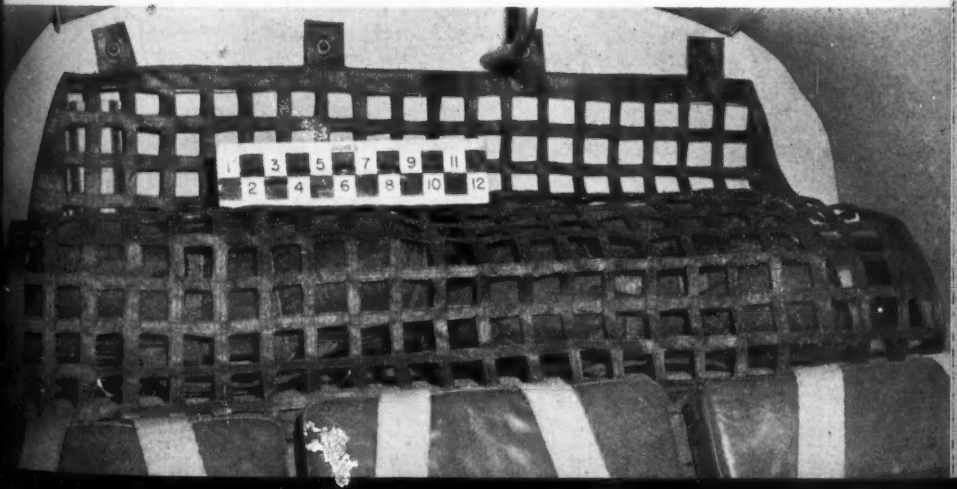
Above, four parachutes stowed on hooks installed along the back of the rear seat assembly of an L-23. Rule shows approximate spacing of the hooks. The first hook is set 14 inches from the right end of the seat assembly, and the distance between it and the fourth hook is 28½ inches. With hooks so located, four parachutes can be easily reached by a person sitting in either the right rear or left rear seat (below).



The second modification is the installation of nylon webbing across the access shelf to secure loose articles stored on the shelf. From lightweight nylon fabric a piece of webbing 41½ inches wide at the base and tapered to 34¾ inches at the top should be fashioned. The base of the webbing is then secured to the underside of the shelf with six 10/32 screws and the top secured to the panel behind the shelf with four metal fasteners. The fasteners can be easily unsnapped to give access to articles during flight.



Above, installation of nylon webbing to inclose shelf above rear baggage compartment of the L-23. Below, parachutes secured under webbing. Webbing, approximately 28 inches deep, will also accommodate four or five parachutes in addition to some briefcases, books, or other small articles.



New Low-Frequency Weather Service

A new Flying Weather Broadcast Service to provide a continuous broadcast of aviation weather and notices to airmen over strategically located low-frequency radio ranges is being established by the Department of Commerce.

Patterned after an experimental broadcast conducted for the past year and a half by the U. S. Weather Bureau and the Civil Aeronautics Administration on the low-frequency air navigational radio range at Arcola, Va. (near Washington, D. C.), 21 additional broadcast programs will be established by the Department of Commerce during 1956.

The continuous broadcast is conducted by means of specially designed tape recorder and repeater equipment, which in some cases will consist of as many as 12 individual recorder units. Weather information furnished by the U. S. Weather Bureau and "notice to airmen" information, including condition of runways, airports, and navigational radio aids, furnished by the Civil Aeronautics Administration are recorded on individual tapes. The equipment is then switched to broadcast, and the individual units report separate portions of weather and NOTAMs in succession. The broadcast cycle is from 4 to 6 minutes in length and automatically repeats itself. Current weather reports are placed into the broadcast at least once each hour. When important weather changes or a navigation notice is issued, the individual tape containing that portion of the broadcast is recut and placed back in the cycle without disturbing the remainder of the broadcast.

Transmitted on low-frequency ranges, the broadcasts can be heard for a distance up to 150 miles. The information transmitted covers a radius of approximately 250 miles. The voice broadcast does not disturb the radio range signals used for navigation even though they are transmitted simultaneously on the same channel. If the radio channel is needed for emergency communications with an aircraft, the broadcast can be cut off and the channel used for ground-to-plane communications.

The first of the 21 broadcast programs included in the 1956 expansion went into operation at Los Angeles last month. As rapidly as possible during the year, 20 other installations will be made on the following CAA ranges:

Albuquerque, N. M.	**Kansas City, Mo.**
Atlanta, Ga.	**Memphis, Tenn.**
Boston, Mass.	**Minneapolis, Minn.**
Chicago, Ill.	**New Orleans, La.**
Cincinnati, Ohio	**New York, N. Y.**
Cleveland, Ohio	**Oakland, Calif.**
Denver, Colo.	**Pittsburgh, Pa.**
El Paso, Tex.	**Portland, Oreg.**
Fort Worth, Tex.	**Seattle, Wash.**
Indianapolis, Ind.	**St. Louis, Mo.**

The Department of Commerce plan includes an ultimate flying weather broadcast network totaling 88 continuous broadcasts on low and medium frequency radio ranges located so as to give coverage to the entire United States.

ETC.

Leighton Collins
Editor, *Air Facts*

THERE IS NEED for a new term in cross country flying. At present we have only two ways of describing how we get anywhere; it's either VFR or IFR, visual flight rules or instrument flight rules. In actual practice, though, there's a gap half a continent wide between what is strictly VFR flying and strictly IFR flying. A large percentage of both airline and corporation multi-engine flying is done in this in-between zone. And now that he, too, is able to fly high, far and fast, the time has come for the single engine pilot to enter this realm.

The new term, whatever it should be, could also be explained as what the new pilot, trained and equipped for IFR operation, actually finds his IFR flying turns out to be like as compared to what he had expected it to be. He starts out with the idea that IFR flying means just one thing: a take-off under very low ceiling and visibility conditions, a climb up into the stuff and grinding away in it according to ATC clearance until the destination is reached, followed by a full dress instrument approach to minimums, with, finally, that incredible and beautiful sight of the cross bars at the end and the big white line down the middle of the runway looming up out of the mists. Sometimes it is that way, but only rarely on a flight of any length. More commonly the new IFR pilot finds himself just sitting on top, musing over the fact that instrument pilots are after all just ordinary pilots doing things much more easily than ordinary pilots and not saying much about it.

It goes like this.

This article, which originally appeared as part of the regular column titled "ETC." by Mr. Leighton Collins in his magazine AIR FACTS *in September 1955, is reprinted with the permission of Mr. Collins. He is owner, editor, and publisher of* AIR FACTS *and has been a leader in the aviation field since 1932. He received his B.S. degree from the University of The South and his L.L.B. from Harvard School of Business Administration.—The Editor*

VFR?

Of a Monday morning recently we set out from Wolfeboro, N. H. for Linden in the New York area, 250 miles to the southwest. The day before had been a hot one, at least for the Lake Winnipesaukee region, and all night it had rained, lightly, with distant thunder once or twice. But now it was cool again, dry CP air was in the pines, the lake was sparkling—typical New England resort weather. While it hadn't had much push, a cold front had obviously gone through during the night. There wasn't a cloud in the sky and it was hard to believe that it would be any different all the way down to New York.

Slow moving cold fronts often drag a low stratus deck behind them, but we had forgotten this and were rather surprised to see clouds ahead as we crossed Laconia on the south side of the lake. We started climbing up for a look.

Way off to the southeast, probably a hundred miles at sea beyond Boston was the front, a great, grey bank of cloud which looked like a distant mountain, very high and sloping steeply up with its level ridge running out of sight to the northeast. The clouds ahead and now below us were broken, but towards the front the deck was obviously solid. It was with somewhat of a start we heard a part of a Concord weather broadcast: Boston 200 and a quarter, Providence 200 and a half, Hartford 1,000 and two. Concord was reporting 3,500 broken with 40 miles visibility and on request gave us Newark which was 1,500 and six, and White Plains was only slightly less.

The question, of course, was whether to go over or under, and we decided to go it on top. Albany was clear, as was Allentown, so we had good weather easily within reach to our right. Pretty soon it was solid, and as so often happens, it took another couple thousand feet to keep 1,000 on top. If it were still overcast on reaching the New York area we would ask for a localizer approach at White Plains and then go on to Linden contact, or make an instrument approach at Teterboro or Morristown. Or if this all proved too much for the New York Center, we could go up the Hudson and come back underneath or get underneath by going over towards Allentown until a VFR descent could be made.

In a sense, on top flying is dull, somewhat like riding a fine pacing horse on a treadmill. But we had a good ride. It was smooth, there was no weather to worry about, and, of course, navigation

doesn't exist any more: shortly out of Laconia the ADF-12 was pointing to the 50,000 watt WOR towers adjacent to Linden Airport; from two to four omni stations were within reach at all times; and even our Airboy, Sr. dry battery standby transmitter and receiver was pulling in the Boston and Hartford and Newark LF ranges at maximum range. So there was really nothing to do.

Only Yesterday

But we couldn't help thinking how differently we'd have made this flight only five years ago, how we would have gone under this morning instead of over and now have been winding down the Connecticut river valley with from one to three miles visibility and around 1,000 ceiling, worrying about the weather, towers, other VFR traffic, and for the most part out of touch with all the omni ranges. And it would have been a hot and rough ride, for the temperatures below Concord hadn't dropped much during the night. As it turned out, this wasn't just conjecture.

The next day we ran into Bill Mauldin and found that he had been flying this route, underneath, just a little later than we did. He'd started out that morning at Camden, Maine with 1,000 & 3 and flown over to Concord. It was tempting, but he was too smart to go on top at Concord as he isn't ready to get down yet IFR, so he stayed under. He soon got his fill of the Connecticut river valley and worked his way westward across the Berkshires with little more than 500′ clearance and got over into the Hudson river valley, where it was broken with cumulus build-ups developing rapidly. In all, he felt he'd taken a pretty fair beating on the trip.

When we got to New York, only an hour and a half out of Laconia, there was a hole right over and just the size of the Upper Bay, so it was possible to make a descent without even circling.

Now somebody may say, of course, "Well what's this guy rattling on about? The flight described was simply a VFR on-top flight."

It was and it wasn't. Nobody guaranteed that hole would be there. In our book VFR flying, as a practical matter, should mean being able to see the ground at all times, both for control of the attitude of the aircraft and navigation as well. Instead of VFR a more accurate term for the flight might be RFR (radio flight rules): the ground was not in sight, navigation was solely by radio, and the whole thing was predicated on being able to make an IFR approach

if need be. It had gotten us a comfortable, uneventful flight, whereas, as Mauldin verified, going it VFR would have been possible but would have gotten us to Linden much the worse for wear.

IFR?

Now let's examine the other extreme, a common type of IFR flight. We wanted to go from Linden to Hendersonville, N. C., in the Asheville area, some 600 miles as we weave it. The Edw. L. A. Wagner Fotocast weather map in the paper the evening before showed that as of 8:30 the next morning the nearest front would be around Columbus, Ohio, and that there'd be southeasterly winds along the coast. Next morning it was overcast in the New York area so all a number of calls to the Weather Bureau got was the busy signal. On our Bendix portable, which has never missed a beat in twelve years now, a scheduled broadcast gave Newark 1,500 and 5, Philadelphia was down to five hundred and one, Allentown was 2,000 and 3, Harrisburg 1,200 and 3, and Washington had 1,500 and six. It looked like simply coastal stratus caused by the easterly winds off the Atlantic, and we surmised that we'd simply swing over towards Allentown and Harrisburg and skirt the low ceilings of the Philadelphia area and the trip would go off as per schedule.

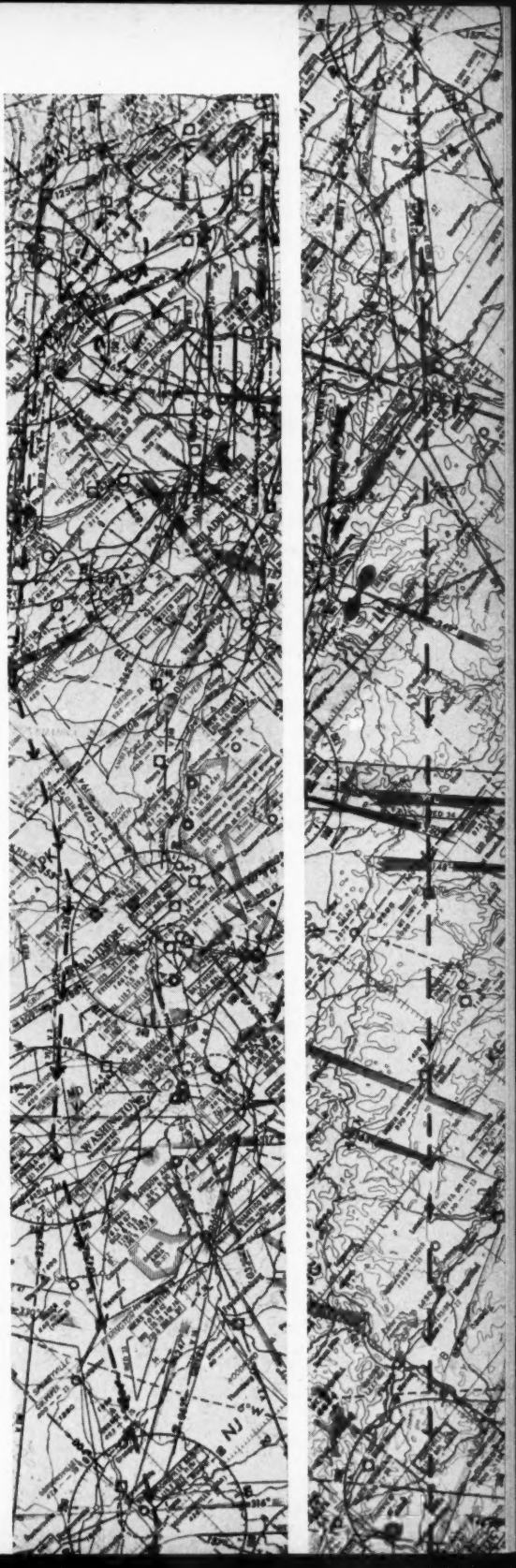
On a heading for Reading, though, the ceiling was soon down to around 800 then 700, 600, 500, with visibility getting down to a mile. By that time the War Department was listing heavily to the right for the 180° turn that seemed to be getting overdue fast. It is surprising how practical women can be about some things. More and more of them now, after a chance to compare VFR on the three-way-stretch basis that 500 & 1 puts it on, prefer flying safely on an IFR flight plan. We finally received the word: this made no sense, it should be IFR or not at all.

So we turned back until it was 800 again, then swung north to get east of Allentown, and finally made it into Allentown VFR with only a couple hundred feet clearance over the ridge east of Easton. Not only that but a sequence giving 400 scattered and 1,200 overcast at Harrisburg made it clear that the idea of skirting the low stuff was definitely out. It was obviously backing clear up to first ridges of the Alleghenies west of Harrisburg, and the 400 scattered appearing at Harrisburg showed that the condensation level of the area was impossibly low for VFR operation in the rolling and hilly terrain ahead.

Weather Analysis

The weather bureau at Allentown confirmed that there was nothing more than this Little Weather in the area and along the route. Winston-Salem was giving broken at 5,000 and their terminal was for scattered thundershowers by early afternoon. Spartanburg was clear and forecast to remain clear. Asheville was 1,000 with 2 miles and ground fog, which didn't mean anything as the instrument minimum there is too high to be of much use anyway. They didn't know what the tops were at Allentown, of course, but were confident of no thunderstorms in the area, and we were willing to gamble that the tops wouldn't be above 5,000. So we filed for 8,000, V-39 to Lancaster, R-33 to Lisbon, then V-39, V-20, R-7 to Winston-Salem, with Spartanburg as an alternate. Winds aloft reports indicated that we'd have a ground speed of 130 at 8,000. We had never operated in the Washington area IFR so looked forward to seeing how John Doe might fare. It should certainly be possible to go *by* a terminal area without stirring things up and the back road around by Herndon ought to do the trick.

We called the Allentown tower from the gas pump and without the engine running asked if they had a clearance for us. They told us we'd first have to get to



the end of the runway. What we were thinking was that there might be a ten or fifteen minute delay and we did not want to block the taxiway or melt our engine for that long a period. So we taxied out and called again.

As a part of our advance preparation we had tried to figure out what routings they might give us instead of the direct one requested and had studied the non-standard holding patterns and fixes along the route, for in trying to get you through you never know what seemingly odd routing they may have to give you in order to fit your flight into the traffic condition existing at the time. Most of the time you can count on a surprise, and we weren't disappointed. 180LC was cleared to the Reading outer marker to cruise and maintain 4,000, hold at the Reading outer marker, and contact Reading approach control for further clearance. In other words, they were first going to get us on instruments and then let us have it. Or at least that's the way you are inclined to feel about it, even though that is not, of course, actually the picture or the intention at all. You can see, though, that once you get stood in the corner like that you sure need some kind of single axis autopilot to give you a chance to do your home work if they give you a completely new and unexpected routing. Actually, this flight could have involved no more than five minutes on instruments as the top at Allentown was only 5,000'. This would have also given us a chance to look around and if we didn't like what we saw to make an ILS approach at either Allentown or Reading.

The True High Road

As it was, we flew on instruments down V-39 the 40 miles to Reading, followed the localizer at Reading out to the outer marker and then started holding. Reading was busy with some airline traffic below making an instrument approach. After about five minutes we were cleared to the Winston-Salem airport, V-39, V-3, V-39, V-20, R-7 to climb immediately to 8,000. At Hereford, a fix on V-3, we were to descend to 6,000 until reaching Lisbon, the next fix on V-3, and then climb back to 8,000. We were also to contact Baltimore approach control in passing Hereford. We wondered why R-33 had been dropped from the clearance as according to our chart it was the only airway running south out of Lancaster, but it didn't matter as the top was only 5,000 and there wasn't a cloud in the sky. At Hereford we couldn't raise Baltimore omni even though reception

was perfect. We flew at 6,000 to Lisbon on V-3, then back to 8,000, and finally raised Herndon omni (we have only 122.1, 122.5 and 121.5) and gave them our estimate for Herndon. Over Herndon we cancelled our IFR flight plan, and the acknowledgment ended with the most sympathetic and solicitous "Good Luck" we ever heard. Somebody in the Washington-Herndon INSAC must not believe in single-engine "instrument" flying. But we do, 180LC would have had no utility at all this day had we waited at Allentown for VFR weather, in fact we'd have had to spend the night in either Allentown or Reading.

At Gordonville we began to see the ground, and in another hundred miles the cumulus buildups you so often find in the changing sub-tropical air mass that reaches out to the Winston-Salem area appeared as Forecast. It took 15,000 to top them, but Hickory, on beyond, was reporting clear, and sure enough, they ended all of a sudden just past Winston-Salem, and we started the downhill slide into Hendersonville, landing there just 4:20 out of Allentown.

Was this really an IFR flight? It did involve some twenty or twenty-five minutes actually on instruments. The rest of it, though, was simply VFR, as the regulatory term goes, or from a practical standpoint, RFR. In any event, had it not started out as it did the trip would have gone by the board, another black mark against the reliability of the private airplane as a means of transportation.

Summertime RFR

Two cases do not prove much, of course, nor would even a dozen. But RFR flying is the thing. We crossed Pennsylvania the other day at 13,000, just above the inversion with a fair number of really big thunderstorms around and an East-West cold front a hundred miles off to our right. Visibility at low altitude along the route was very poor, three to five miles.

They've always said, in big print: KEEP OUT OF THUNDERSTORMS. Fine, all are in favor. But how are you going to do it, flying along in a three to five mile haze condition. You run into a little shower, which you can't see until you get to it, make some sort of a wishful turn of from forty-five to ninety degrees, and soon are in heavy rain with first only vertical visibility left and soon maybe none at all.

Sitting over Pennsylvania there at 13,000 we heard a couple of pilots frantically call for advice about what to do to get around

or away from a thunderstorm condition they'd run into. The ground stations try to help, but they are poorly equipped. All they know about is what they can see, which is very little. In trying to steer a man around a thunderstorm they observe, say, north of their station they may route him underneath a real thunderstorm which they can't see that is behind the shower.

Next day we flew from Defiance, Ohio down to Asheville, again at 13,000. It would have been at best a miserable flight down low, due to the haze conditions along the route, and could even have ended up in a frantic lot of milling around trying to find a place to get down in a large area in which there are few such places. 13,000 topped most of the cumulus build-ups, the rest we went around, and along the course it was necessary to detour three really monstrous thunderstorms, which went beautifully up to thirty or forty thousand feet. Think of the anxiety that would have been inescapable in trying to thread through that area flying low! But at 13,000 there was no weather. As long as you can see it and keep it at a distance there is no sweat.

Next day coming back to New York we flew at 14,000, running along the whole way with a line of thunderstorms on our left (a cold front eight hours ahead of schedule) and scattered to broken on our right, with nothing higher to the right and the coastal stations giving reassuring reports. The stations along the way were obviously treating these thunderstorms as air mass weather. The Roanoke operator was trying to tell some fellow how to go around one, when from where we sat there was obviously no way for him to go around: he was trapped in an area of closely bunched thunderstorms.

We couldn't help thinking how fouled up we'd also be had we stayed low and held to course, as we were tempted to do, when we hit the first rain shower just out of the Knoxville ADIZ instead of flying east and climbing up to where we could see what was going on. This front, incidentally, should have been announced as a special all up and down the line as it was well known (at least to the airlines) and it hit Roanoke, Gordonville, Washington, Baltimore and New York all at about the same time, and with considerable intensity. Washington Radar did announce its arrival at Washington just before it hit and Washington suddenly went from 3,500 broken to a precipitation ceiling of 900 feet with a mile visibility, and soon afterward to 600′.

Considering the possibilities of one of those situations of run-

(Continued on page 37)

UER HIGHLIGHTS

Major Fred R. Reed, *Transportation Corps*

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or The Army Aviation School.—The Editor

PERSONNEL of the Transportation Supply and Maintenance Command review many different types of reports from the field. In addition to Unsatisfactory Equipment Reports, there are available for study manufacturers' technical representative's reports, reports of inspection, and reports of technical assistance visits. From these reports, it is apparent that the old problem of operations versus maintenance is still with us and the problem becomes more serious when aircraft are involved.

Commanders frequently find themselves faced with a decision as to what to give priority, operational or maintenance requirements, particularly under tactical conditions. There is no established rule that applies but, before the commander can make a sound decision, he must be just as fully apprised of the maintenance problems involved as he is of the operational problems or requirements. Too often, it appears that he is being fully informed only about the operational requirements.

A second problem, which frequently comes to light, no doubt stems from the enthusiasm that is found among the majority of personnel concerned with Army aviation. This problem entails attempts, by Army aviation personnel, to exceed authorized maintenance echelons.

The maintenance system employed by the Department of the Army is sound and proven. The success of this system, however, is dependent upon two basic factors. The first factor can be briefly defined as "command attitude," meaning the attitude of commanders toward the maintenance program as a whole. The second factor, "maintenance know-how," is a direct responsibility of maintenance personnel. It combines a thorough understanding of "who does

what" with a firm policy to avoid exceeding the skills and capabilities of assigned personnel. Maintenance which requires evacuation to a higher echelon frequently generates a desire to perform the work in the lower echelon. It is this desire that must be controlled.

If operations and maintenance personnel recognize each other's problems and direct their thinking toward preventive maintenance, maintenance will continuously improve.

For highlighting this month the following items were selected:

Fixed Wing

Problem: Door Handle Cutting Into Window Assembly, L-19.

A complete study of this problem has been made. A door handle rub sleeve has been designed, and a technical bulletin providing instructions for local manufacture will soon be published. This sleeve is to be fabricated at the field maintenance level and may be installed by either organizational or field maintenance personnel.

Problem: Rear Heater Outlet Shields Collapsing, L-19.

From all the UER's received, it is obvious that the material in the shield is too light. The heater outlet shields were installed under the provisions of TO 1L-19A-212. The contractor has furnished details on a repair measure that provides a guard to prevent further damage. A technical bulletin covering the item will reach the field soon.

Rotary Wing

Problem: Requirement for Cargo Release on Copilot's Side, H-19.

This requirement for a cargo release in the copilot's side of H-19's has finally been met. It originated quite some time ago, and an engineering change proposal has been approved and a military interdepartmental purchase request forwarded for action. The present cargo release is located on the pilot deck and is operated by the pilot's right foot. This necessitates the pilot's removing his foot from the directional control pedal to release the cargo. The approved modification will provide an automatic electrical release

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***The UER Highlights Department**, prepared by Major Fred R. Reed, is compiled from information contained in Unsatisfactory Equipment Reports received by the Transportation Corps Supply and Maintenance Command, 12th and Spruce Streets, St. Louis 2, Mo. Major Reed is Chief of TSMC's Publications Division.—The Editor*

cargo sling system that will enable the pilot or copilot to release the cargo without removing hands or feet from the controls. Kits for the modification are being procured and the Air Force is preparing a technical order to cover the installation. This installation will be at the field maintenance level.

Problem: Frame Cracking in the Area of the Central Transmission Attaching Points, H-21.

There have been many UER's submitted that report not only frame cracks but skin cracks in the same general area. We need more help in the form of UER's from the field to help us solve this serious problem. To date the apparent reasons for the discrepancies are the inherent vibrations of the machine itself. This vibration problem is under continuous study. Until something more definite can be furnished, adhere to the instructions for repairing cracks as outlined in TO 1H-21(Y)-3 and continue to furnish this Command with information by way of UER's.

Problem: Binding of Tail Rotor Spindle Bearings, H-34.

The UER's from the field on this discrepancy brought to light an apparent design deficiency. TO 1H-34A-504, dated 11 July 1955, directed a 25-hour inspection of the bearings. The bearings, part number AD-12B, were to be removed and inspected for brinelling. Any evidence of brinelling or scoring called for rejection of the bearing. If no evidence of brinelling or scoring was found, the bearing was to be reinstalled in reverse of the original installation to present a new surface for centrifugal loads. This same technical order directed that at every 50-hour interval, all bearings would be removed, condemned, and replaced with bearings, part number AD-12B-1. TO 1H-34A-526, dated 14 November 1955, directed an additional inspection of all H-34 tail rotor assemblies for defective bearings. These bearings were identifiable by individual separators and snap rings. The current status is as follows:

a. Inspection of all bearings will be made at 25-hour intervals.

b. Bearings will be replaced at every 50-hour interval.

c. The approved type bearings for use in tail rotor spindles, H-34, are as follows:

(1) AD-12B-1 solid cage type

(2) AD-12B-1X

(3) AD-12B-2

(4) Alternate when (1), (2), or (3) above is not available: AD-12B.

Bearings listed in (1), (2), and (3) are carried under one Federal Stock Number, 3110-278-6920. Bearing AD-12B is carried under Air Force stock number 3400-511256.

Problem: Corrosion of Fuel Strainer Assembly and Check Valves, H-34.

UER's indicate corrosion of the fuel strainer assembly (S1630-62039), housing (S1630-62041), and the check valves (MS28885-16) due to accumulation of moisture in the lines. This is caused by the drain valves being located above the level of the emergency lines, preventing proper drainage. TO 1H-34A-525 has been issued directing inspection of the emergency fuel system for internal corrosion. TO Supplement 1H-34A-6F has also been issued, requiring a 5-minute engine operation on the emergency fuel system prior to the first flight of the day. This will serve to eliminate accumulation of moisture in the system until a redesign can be incorporated.

Power Plant

Problem: Broken Connecting Rods, 0-335-5.

The exact cause for considerable number of failures reported has not been determined. Some contributing factors have been noted:

a. Possible material weakness.

b. Overspeeding of engines.

c. Removing piston pins during cylinder change without proper tools.

The indication that improper tools are being used to remove piston pins warrants some discussion. A drift pin and a hammer are *not* the proper tools! The proper tool is the puller, piston pin removing, part number 9AAZ-19426. This tool is authorized on the basis of one per two aircraft at organizational level and one per each field maintenance facility. If this tool isn't on hand, requisition it, then use it.

Problem: Cylinder Head Seals Leaking, 0-470-11.

This problem was covered in the January column. We asked

for additional UER's and have been receiving them. Further investigation has provided some additional information that should be of help in the field. It is possible that the leakage is actually the sealing compound that melts at excessive temperatures. It has been recommended that apparent defective cylinders be given a chance to become resealed during some additional operation prior to being removed. Of course, if resealing doesn't occur, send in additional UER's.

Problem: Vacuum Pump Shaft Sheared, 0-470-11.

UER's indicate the oil inlet line clogging, resulting in failure of the internal components. Investigation reveals that one or a combination of the following factors could cause the failure:

a. Sludge or carbon clogging the oil inlet passage.
b. Foreign matter scoring the internal parts of the pump.
c. Installation of defective couplings at time of pump overhaul.
d. Insufficient clearance of pump parts during assembly at time of overhaul.

Personnel in the field can do a great deal in correcting these deficiencies, at least in two areas:

a. Check engine oil frequently to insure that it is not contaminated. Should any foreign matter be found, change oil in accordance with TO 2-1-15. Clean oil strainers as outlined in the applicable Dash-6 handbook.
b. Check and clean air filters frequently. Cover all openings when vacuum system components are removed for replacement.

The overhaul facility has taken action as follows:

a. The basic overhaul handbook for the vacuum pump has been revised to require that couplings be magnetically inspected at time of pump overhaul.
b. Precision measuring equipment is being utilized to maintain dimensional control of all parts. Improved quality control measures have been initiated on all phases of pump overhaul.

(Continued on page 30)

BOOKS

For The Army Aviator

MAN AND THE WINDS—*Aübert De La Rue, E. (translated by Thompson, Madge E.). (Philosophical Library, Inc., 15 E. Fortieth St., New York 16, N. Y., 1955)*

Enormous areas of the earth are almost entirely dominated by the wind. In the polar regions and the deserts it is, perhaps, the most powerful element of life. Although atmospheric currents fortunately do not rage everywhere with the same intensity, every country has some real "wind corridors," through which the air currents blow with notorious violence. Even the most favored regions, enjoying a relatively calm climate, are not entirely free from accidental disturbances giving rise to gales. Mr. De La Rue thus points out that the winds have always greatly influenced the life of man, and never more so than today.

He presents in interesting narrative style how in the past the wind has been used mainly in navigation but points out that, with today's demands for energy, further exploitation offers another challenge and opportunity. The author's discussions of the various types of winds, how wind affects climate, the importance of atmospheric circulation in aviation, and benefits and drawbacks of the wind will be of particular interest to the Army aviator.

GUIDE TO THE STARS—*Macpherson, Hector. (Philosophical Library, Inc., 15 E. Fortieth St., New York 16, N. Y., 1955. $2.75)*

Like most other scientists, astronomers are today in possession of a mass of knowledge undreamed of by their predecessors of 50 years ago. This, of course, has been possible through refinement of the telescope and the camera and development of the spectroscope; however, the increasing interest in outer space and space travel has emphasized the importance of detailed data on the various constellations and their relations to the earth.

Dr. Macpherson, author of numerous other books on astronomy,

takes the reader step by step through the constellations, showing by exact, simple directions how to identify each, as well as the more important stars. Colored maps of the constellations are provided to further simplify identification and to show the magnitude of the separate stars. The aviator, although more familiar with the night sky than the layman who does not fly, will find in Dr. Macpherson's book a thorough, well-organized treatment of astronomy which will bridge the gaps in knowledge acquired perhaps spasmodically or without professional direction. For those readers particularly interested in the details of the night sky, *Guide to the Stars* serves as a practical handbook from which to pursue further the field of astronomy. Also covered by Dr. Macpherson are results of modern discovery and research as they relate to man's knowledge of the nature of the stars and planets.

STRATEGIC AIR POWER FOR DYNAMIC SECURITY— *Possony, Stefan T. (Combat Forces Book Service, 1529 Eighteenth St., N. W., Washington 6, D. C., 1949. $5.00)*

This book, a standard work on the place of strategic air power in modern war, is interesting and informative reading for all personnel in military service. The author covers accomplishments of strategic air power during World War II and states what it may be expected to accomplish if we are forced into another such conflict.

Dr. Possony points out that not air power alone but triphibious power decided World War II. He warns of the dangers of thinking that any future war would be either an enlarged pattern of yesterday's war or a pattern entirely new. Dr. Possony covers the atom bomb and other, older types of bombs with equal thoroughness for, as he shows, the latter are still most important and will continue to be so for many years.

Strategic Air Power for Dynamic Security offers the military reader considerable food for thought on our country's role as the victor of yesterday and how to be tomorrow's victor if that task should be forced upon it.

Book reviews are compiled by the ARMY AVIATION DIGEST staff. Views expressed are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor

ELEMENTS OF PROPELLER AND HELICOPTER AERODYNAMICS—*Dommasch, Daniel O. (Pitman Publishing Corporation, 2-6 W. Forty-fifth St., New York 19, N. Y., 1953. $4.50)*

A textbook designed for undergraduate college use, this book provides both the seasoned aviator and the beginning aviator with the technical answers as to exactly how and why rotating airfoils behave as they do, covering the elements of both propeller and helicopter aerodynamics.

The author, who is chief engineer and chief instructor in the Test Pilot Training Division, Naval Air Test Center, discusses in detail basic principles and definitions, the blade-element theories and application, propeller characteristics, axial flow through the helicopter rotor, helicopter forward flight, and helicopter stability and control. The rotary-wing aviator will be particularly interested in the latter two sections, which explain the technicalities of blade flapping, forward flight coefficients, and stability and control of the helicopter.

Elements of Propeller and Helicopter Aerodynamics is one of eight volumes in the Pitman aeronautical engineering series. Others in the series cover airplane design, aircraft materials and processes, principles of aircraft propulsion machinery, aerodynamics of supersonic flight, airplane aerodynamics, and aircraft structural mechanics.

Crash Report

THE CRASH REPORT, a recent major addition to the Army aircraft accident reporting procedure, is effected with Change 3 (dated 27 Dec 1955) to SR 385-10-40. The report consists of a priority TWX notification of any Army aircraft accident, and it must be filed immediately after the accident occurs by the first commanding officer to become cognizant of the accident to Chief of Staff, U. S. Army; the Army Aviation Safety Board; and other agencies and commands concerned (See SR 385-10-40).

The Crash Report must contain as much of the following information as is immediately available:

1. *Primary accident data*—date and time of accident; location of accident; description of how accident occurred and statement including pertinent facts concerning the cause; weather at scene of accident.
2. *Aircraft*—type, model, series, serial number; unit to which assigned; home station; brief description of damage to aircraft.
3. *Operator*—duty and mission of flight; full name, service number, grade, unit to which assigned, home station, use of parachute, and degree of injury.
4. *All crew members*—duty on aircraft and identification information as prescribed for the aircraft operator.
5. *Any other person aboard or involved in accident*—identification, parachute, and injury information as prescribed for operator and crew members.
6. *Other information as appropriate*—statement of any violation of flying rules and regulations, citing specific regulation; description of any known or suspected maintenance or inspection error, material failure, or malfunction; complete stock list number of failed part pertinent to the accident, if known; engine model and series, serial number, total time, time since overhaul, depot and date of last overhaul, previous storage history, cause of failure, power settings, and significant engine indications if engine failure or malfunction is a factor.

If all of the above information is not immediately available, do not delay the Crash Report but send the information that is available and follow-up with a preliminary report. The preliminary

report, containing prescribed information omitted from the Crash Report, should normally follow the TWX within 3 hours and, in all cases, must follow within 8 hours after an Army activity becomes cognizant of the accident. Preliminary reports are given routine precedence. Supplemental reports may be submitted as required to provide prescribed information not available within 8 hours after discovery of the crash.

The use of commercial electronic communications facilities is authorized for a crash report when military facilities are not available. However, the message will then be abbreviated as outlined in Change 3, and names of persons involved and probable accident causes will not be reported.

Before the Crash Report was put into effect, the accident report, DA Form 285, was the only means of aircraft accident notification. At best, these accident reports, when received by the Army Aviation Safety Board, are from 60 to 90 days old, with the majority being closer to 90 days. In cases of death, or a more involved accident, reports are from 3 to 9 months old before reaching the Army Aviation Safety Board. The Crash Report procedure will provide the Army Aviation Safety Board and other agencies with a current summary of aircraft accidents which reflects the true Army aircraft accident picture. The immediate effectiveness of the new crash reporting procedure depends on how quickly air officers and commanders in the field become familiar with the procedure. So if your air section has not received Change 3 to SR 385-10-40, get a copy as soon as possible and become familiar with its provisions.

(UER HIGHLIGHTS continued from page 25)

In closing, may we of the Transportation Supply and Maintenance Command, unofficially through this column, commend each and every one of you for the splendid support of the Unsatisfactory Equipment Report program. Every UER submitted is another step toward improving our strength and combat readiness. And again, we urge you:

Don't live, or perhaps die, with an unsatisfactory condition. REPORT IT!

The Gray Hair Department

PILOT INEXPERIENCE and weather are the two contributing factors listed most frequently in Army aircraft accident reports. This month we will discuss the inexperience factor. On the surface it appears that, since the best possible schooling and excellent equipment are provided for pilots, there is no means of decreasing this contributing factor. However, an analysis of the Army aircraft accidents for the past 2 years shows that, although pilot inexperience is

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Lieutenant Colonel J. Elmore Swenson, *above, one of the Army's most outstanding senior aviators is Chief, Aviation Section, for the Deputy Chief of Staff for Personnel, Department of the Army. Since graduating from Army Pilot Course Number 1 in 1942, he has made a large part of the history of Army aviation. He was instrumental in establishing the first Army aviation personnel policies; he wrote the first Army aviation regulations; he designed the wings which all Army aviators wear; he played a leading role in the formation of the first Army aviation company in Korea; and later, after returning to ZI, he played one of the leading roles in the founding of the ARMY AVIATION DIGEST. These are but a few of the contributions which he has made to Army aviation.*

Colonel Swenson is one of the most highly qualified aviators in the Army. He has over 3200 hours pilot time, both instrument and multi-engine ratings, and is rotary-wing qualified.

He received his Bachelor of Science degree from the University of Utah in 1940 and his Master of Arts degree from George Washington University in 1951. His military education has also been extensive. In addition to

involved, the primary fault, when inexperience is listed as a contributing factor, more frequently lies with supervision than with the pilots.

Relatively new pilots become involved in flight situations which exceed their capabilities because of supervisor inexperience or failure to enforce the regulations.

Further analysis of the accidents with contributing factors of "inexperience" listed indicated three failures of supervisory personnel: first, failure to provide proper unit transition training; second, failure to consider the capabilities of the individual pilot; third, improper supervision of the unit's operations. The following are examples in which the supervisor, either through his own inexperience or through negligence directly or indirectly contributed to the accident:

No Checkout

Three weeks after graduation from The Army Aviation School, a pilot was dispatched on his first flight as a rated Army aviator. It was a training mission for a student observer. The flight progressed smoothly; and, upon completion of the mission, the pilot headed for the homefield. Approximately 10 miles from the field, he called for landing instructions. The tower told him to use runway 02, left hand traffic, and that the wind was east 5 to 10 mph.

The pilot flew a normal pattern, turned onto the final approach, lowered his right wing in order to remain lined up with the runway, and proceeded to touchdown. His smooth touchdown was followed by a short, straight-ahead roll. Suddenly the aircraft "seemed to

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officer basic schooling, he is a graduate of the Artillery Officers' Advanced Course, the regular course of the Command and General Staff College, and the Armed Forces Staff College.

He was a leader of Army aviation in combat in both WW II and the Korean War. During WW II, he made the Normandy D-day landing and was in combat in all major European campaigns as Division Artillery Air Officer of the 29th Infantry Division. After WW II, he was assigned as Fifth Army Light Aviation Officer and from this assignment went to the Career Management Division, General Staff, Department of the Army, as Aviation Officer. During the Korean War, he served as Eighth U. S. Army Aviation Officer. Upon his return to the ZI in 1953, he was assigned as Secretary of the Army Aviation School, where he remained until receiving his present assignment in 1955.—The Editor

pull to the right." The pilot applied left rudder and hard left brake but the aircraft turned abruptly to the right and ground-looped, buckling the left landing gear and coming to a halt 180 degrees from the direction of landing.

The pilot's failure to recognize a ground-loop situation was probably the biggest factor in causing this accident. Investigation, however, revealed that the unit supervisors had made two important errors. First, and most outstanding, the pilot had received no checkout upon arrival at the unit. A proper checkout from one of the more experienced pilots in the unit and an opportunity to shoot some landings both with and without an instructor would have not only made his supervisors aware of his capabilities but also refreshed his techniques before an operational mission was assigned.

Second, wind conditions were not as stated by the tower operator. Investigation showed that the wind was from the southeast at 10 to 15 mph, which resulted in a downwind, cross-wind condition on runway 02. This error was due to failure on the part of the tower operator to realize the importance of wind on landing. It is elementary to all pilots that, with a 15-mph wind, there can be a difference of 30 mph in ground speed for a landing aircraft, depending on whether the craft is landing into a 15 mph headwind or with a 15 mph tailwind. In an L-19 this means the difference between touching down at a ground speed of approximately 27 mph or at one of 57 mph. Since the flow of air over the control surfaces is the same at both ground speeds, this means that the pilot has no greater control forces to apply at 57 mph than he has at 27 mph. Errors which occur in landing will happen almost twice as fast at the higher speed, and yet corrective capabilities remain constant.

Perhaps the trouble lies in our treating the L-19 with the familiarity which breeds contempt. It must be remembered that almost 75 percent of the Army-wide, fixed-wing accidents involve L-19's. Supervisors must not relax their vigilance because of their familiarity with the L-19. Carelessness will surely create conditions which are favorable to the occurrence of an accident.

***The Gray Hair Department** is prepared by the ARMY AVIATION DIGEST staff with information obtained from the files of the Army Aviation Safety Board. The views expressed in this department are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor*

Long Time between Flights

Consideration of a pilot's proficiency is lacking among many supervisors. Assignment of pilots to missions should be based upon the capabilities of the individual pilots of the unit and not on random choices. The following case illustrates how accidents can happen when individual pilot proficiency is not considered.

The pilot involved had accumulated a total of 31 hours flying time over a 7-month period spanning the time between graduation and the accident. Upon graduating from the fixed-wing tactics course, he proceeded to his branch school to attend a 13-week basic course. During his attendance of the branch school, he flew a total of 19 hours. In the following 2 months, he did no flying because of leave time and the oversea travel time to his first aviation assignment. He reported into his unit 6 months after graduation, with 19 hours pilot time.

In the succeeding 4 weeks, he accumulated 11:05 hours, all solo. His mission on which the accident occurred was to fly a personnel officer to several outlying units, landing on semi-improved or emergency-type strips located near each unit. Although these strips were of an emergency type, none would present a particular problem to a pilot with average experience and proficiency. The weather conditions were: clear, visibility 7 miles, wind NW 10 to 15 knots.

Arriving over the first strip, the pilot made a high reconnaissance and low drag then lined up for a north landing. With 60-degree flaps, he made two attempts at a landing but came in high each time. On the third attempt he landed smoothly, in a 3-point attitude and practically on the edge of the runway. His aircraft, however, was canted slightly to the right on touchdown, and, to correct his heading, he applied left rudder slowly. The corrective action had no effect. Then with left rudder full in, he applied left brake, but still the aircraft continued toward the right side of the strip. Suddenly the right wingtip struck a fence post, swinging the aircraft 90 degrees to the right and into a ditch which paralleled the runway. The cost of this landing amounted to $815.

The pilot erred by, first, using 60-degree flaps in a 10- to 15-knot, left quartering cross-wind. A lesser flap setting would have given him more rudder control on his landing roll. Second, he was not lined up with the runway on touchdown. Third, his reactions were slow, as well as his application of left rudder. Further, skid marks indicated that he applied right brake about the same time that

he applied left brake. With full left rudder, it is sometimes difficult to apply hard left brake, especially if the pilot's seat is not adjusted properly and he must stretch his leg out to its full length. At the same time, the right rudder pedal is pressed against the pilot's right foot and he can easily unintentionally apply right brake. All of these errors can undoubtedly be attributed to a low pilot proficiency level.

A glance through the pilot's Form 5 would have indicated a need for unit training. Second, SR 95-15-5, par. 14*a*(1)(2), requires a proficiency check of any Army aviator with less than 500 hours if he has not flown at least 1 hour in the preceding 30 days. Had the regulations been complied with and had the pilot's state of proficiency been considered, this pilot would not have been assigned any missions until he had been cleared by a qualified unit instructor pilot.

Summary

We cannot expect to eliminate accidents which occur because of pilot inexperience until we eliminate supervisory errors. Supervisory error itself is caused by inexperience and negligence. Negligence is not excusable. As for inexperience, it is the responsibility of all unit commanders to fill their supervisory positions with their most experienced personnel or at the very least to provide a training program which will assure that their supervisors know their duties.

Experience is gained best through training, and it is the responsibility of the unit commander, after ascertaining that his supervisory personnel are as capable as humanly possible, to see that flight rules and regulations are implemented and that pilot personnel assigned to his unit receive adequate training.

A well-planned unit transition training program for newly graduated pilots is the beginning of the solution. This transition training should develop the new pilot's judgment and technique in the practical application of his training in the unit. Along with routine checkouts on flight maneuvers and unit landing strips, the new pilot should be trained to cope with special conditions existing in the unit, such as unusual local weather and terrain. He must receive special training in the unit's missions. Flying responsibilities should be given gradually, commensurate with his progress. This type of program will get the new pilot's feet on the ground "in the air" as an Army aviator.

Every aircraft accident is the result of a chain of incidents or happenings. In most cases, if this chain is broken at any point, the accident will not occur. For example, in the first accident above, if the pilot has been properly checked out, the accident would possibly not have occurred. If the tower operator had realized the importance of wind on a landing aircraft and had given proper landing instructions, the accident might not have occurred. In the second accident, if regulations concerning pilot proficiency checks had been complied with, if the supervisor had evaluated the pilot's experience, and if an experienced pilot had been assigned the mission, the accident would probably not have occurred. Only when we break all the links of the chain can we feel that we have eliminated human error, and the first links we must break are those made by supervisory error. Most unit commanders know how to establish proper training programs and how to implement rules and regulations, but many still fail to take action which will assure the safety of their command, and safety is a command responsibility.

Army-industry cooperation is substantially demonstrated by the H-21 maintenance training program currently operating at the 153d Transportation Detachment (cargo helicopter field maintenance) at Fort Belvoir, Va.

Under a training contract with Piasecki Helicopter Corporation, manufacturer of the H-21, 20 individuals from the company have been assigned to the helicopter maintenance unit to train Army mechanics and technicians on the job. Each civilian mechanic is paired with one enlisted mechanic, and as a team they accomplish scheduled inspections, unscheduled maintenance, and overhaul of the 1425-hp helicopters. The H-21's are given complete inspections by the maintenance teams every 30 hours of flying time; in addition, the teams replace component systems periodically. During one 42-day period, the unit accomplished 15 major inspections.

The 153d Transportation Detachment is attached to the recently created Davison Airfield Command, the Army's second largest aviation installation. Helicopters of the Command were used extensively in "Operation Noah" during the widespread New England floods and, more recently, to transport top Government officials to conferences with President Eisenhower.

(ETC. continued from page 20)

ning out of weather, daylight, and gas all at the same time, we landed at Easton, Maryland just as the front hit Baltimore. Although we had muffed it by getting started thirty minutes too late in the day, the flight was still a very significant one to us. As we used to fly it, we most certainly wouldn't have gotten past or even to Lynchburg this day (and been stuck the next day till past noon), and we could easily have gotten into trouble and had to pick some random field. As it was, we had not only a smooth, cool, and pleasant ride, but no anxiety at all about the weather. RFR flying not only adds safety, but serenity.

The Airlines Too

As mentioned earlier, this type of flying encompasses also a good part of airline operation. We were rather surprised recently in talking with a friend who flies a DC-6 on a New York to Dallas non-stop run when he said that on most of his flights the first thing he does is to climb to 20,000 and then if he is in the clear and it looks as if he can stay in the clear he cancels his IFR flight plan. He also said that if there was any weather, especially thunderstorms, along the direct route sometimes he would fly to Dallas as far around as by Kansas City, or at other times way down around by New Orleans. We had always thought that the airline pilots had to follow the airway along which their company was certificated, except in an emergency or in going to an alternate. But apparently not. This fellow flies RFR mostly, following any route he pleases, just so it gets him the best weather, or, you might say, no weather. In other words, his flying is *principally* RFR.

A Closer Look

We hope we are not belaboring the point, for there is nothing new here. But the concept is an important one for the thousands of pilots who hesitate to take the plunge on "IFR" operation. There are some proscriptions, of course. The RFR pilot needs top reports, oxygen, good ceiling and good range. He needs to make sure that he isn't getting involved in any frontal activity. He needs to know what's causing the weather situation with which he is trying to cope, and that he has an out within certain range, or in other words, where the good weather is. He must realize that possibly one out of ten RFR flights will terminate with an instrument approach, usually

from on top. Beyond that, he winds up with an instrument rating which he uses so seldom he has to do a fair amount of hood practice in order to keep it current.

Nor do we want to make it sound too pat, for there are area considerations. Dr. Roscoe Wilson of Salem, Oregon, who flies a Stinson 150, told us last summer that as a result of all the IFR talk in *Air Facts* he had gotten an instrument rating, but that he hadn't yet picked himself a piece of Little Weather and really cut his teeth yet: where he lives the instrument minimums are often 10,000', which obviously puts a little different slant on Little Weather in that area. Recently we heard a former *Comet* pilot talking to a group of pilots. He said, "You remember how we all thought that when we could just fly at ten or twelve thousand we would top most of the weather. Then we began to hope for 20,000, where the airlines are now. I want to tell you," he continued, "I have flown a *Comet* at 40,000' for five hundred miles on solid instruments. If we want to talk about really topping *all* the weather, we will have to set our sights at 75,000'."

By and large, though, the real solution to the utility problem in private aircraft is in more RFR flying, for when you began to consider the enroute weather problem as it exists between mostly 10,000 to 20,000' you are dealing with an entirely different set of facts and figures from those applying to enroute weather as it exists between the ground and 10,000'. The RFR pilot can fly weather with a degree of confidence and relaxation and safety, and reliability of schedule which the VFR pilot can never know.

A Great Opportunity

While airplane acceptance is running at such high tide, the industry should be driving hard on trying to make a still better RFR single engine airplane. The twins are wonderful, but RFR flying cannot possibly have the broad base it should at a starting price of $35,000. We need to be able to also do it with the minimum of equipment.

One thing, for instance, that is needed for a better RFR single engine airplane is absolute radio reliability, which in turn means two entirely independent sources of electrical supply. From Wolfgang Langewiesche we get this idea: we should do away with the dual magnetos, which are heavy and expensive, and put in their place two small generators. One generator would run one set of

spark plugs and carry one transmitter and Omni ILS receiver and have its own small battery, the other would run the other set of spark plugs, and carry the ADF or a second omni and a transmitter and separate battery. There would be no common junction of any kind between the systems, making it possible to switch generators or batteries and thereby knock everything out, in case of a complete short in either system. Battery ignition was once tried in airplanes and it did not get a good name, but it was because of having only one generator and one battery. For additional reasons, now, we need the second generator, which will also make battery ignition acceptable and may even reduce both cost and weight.

Something could be said, of course, about range, the faster the airplane the more, or in any event not less than a thousand miles. But a more immediate problem of a complete RFR single engine airplane is, in summer now, the pleasant thought of icing conditions. The RFR pilot needs to be able to go up through and descend through icing levels and be able to hold, if need be, for a reasonable time at an icing level. This problem is of primary importance, for RFR flying can mean even more utility in winter than in summer; the tops are generally lower.

The industry needs, too, to drive hard for more RFR training. The present practice is to seek organization which will put sales and service foremost rather than organizations which put flight training and service first and sales back to wherever or whenever they can get around to it. An adjustment to a more effective middle ground on this is needed because a $15,000 or $20,000 airplane which can't go because of a Little Weather situation is as useless as a sailboat for business purposes. In contrast, if the airplane and pilot are fitted to RFR flying it is easy to see that we have only begun to realize the potential value of the single-engine private airplane as a means of safe, comfortable, and reliable transportation. But it doesn't exist, and never did exist, and never will exist on the basis of VFR low altitude operation. The 10,000 to 20,000′ level is the Klondike of the air.

The next thing is to get them up there on less money, in smaller high-performance airplanes.

Straight and Level

TO: *Editor-in-Chief*

. . . I thoroughly enjoyed the October *Digest* particularly the article "Problems in Helicopter Pilot Training" by Major Hubert D. Gaddis. I'm sure our readers (well over 38,000 of them) will enjoy it also and so we are reprinting it (crediting the *Digest* and Major Gaddis, of course) in our December issue.

WINSTON O. COLBY, Pub.
U. S. Flying News, Chicago, Ill.

TO: *Editor-in-Chief*

. . . The story in the September issue "Jungle Re-supply with L-19" was of very great interest to me as I served with the 24th Fighter Squadron at Madden Field for nearly a year in 1944. I can well appreciate the problems in this story concerning the jungle growth. It was much preferred by our pilots to ditch in the sea than in the jungle as many who bailed out over the jungle never made it back. While I enjoyed this assignment at Madden Field I will never forget the large number of snakes that came our way each day.

ROBERT L. TAYLOR, Pres.
Antique Airplane Association

TO: *Editor-in-Chief*

Through the Army advisor, we have occasionally obtained copies of the *Army Aviation Digest* and we find "The Gray Hair Department" particularly interesting. In fact we use it as instructional material. However, we only get one copy and occasionally miss getting it. We would like to conduct regularly scheduled instruction using the magazine as a source of material. Is there any possibility of obtaining additional copies and if not could we receive copies of just "The Gray Hair Department?"

WILLIAM D. KLEIN, 1/Lt, Inf
NGUS

Several requests have been received for additional copies of the DIGEST *for use as instructional material, and we regret at this time that they cannot be furnished. However, it is anticipated that additional copies will be available within the next 60 days, and every effort will be made to supply organizations needing copies for instructional work.—The Editor.*

TO: *Editor-in-Chief*

. . . let me commend you on the standard of quality produced in the *Army Aviation Digest.* It is important not only to we who are professionally engaged in the field of aviation, but to the Army which is becoming increasingly aware of the significance and future of Army Aviation.

FREDERICK W. RUPP,
Capt, CE
Head, Special Projects Office
Training Manuals Branch
The Engineer School,
Ft. Belvoir, Va.

Letters of constructive criticism are welcomed by the ARMY AVIATION DIGEST. To appear in this column they must be signed.—The Editor